ARCHITECTURAL BUILDING ENGINEERING (ABT)

ABT 111 Introduction to Building Science
1 Class Hours, 1 Quarter Credit Hours
This is a survey course which introduces students to Building Science. Primary topics will include the many professional disciplines and career paths available to graduates. Additional topics will also include the skills and attitudes necessary to the disciplines, professional ethics, relationships with other trades and professions, construction documentation, and LEED.

ABT 112 Technical Drafting and Graphic Communications
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
This course is designed to give students the basic understanding of Architectural Drafting and Graphic Communications through the exploration and use of drafting materials and methods using both two- and three-dimensional exercises. The emphasis will be on wood frame construction. Architectural lettering, line work, and standard abbreviations will be covered, as well as the proper use of architectural and civil engineering scales. Basic concepts are introduced including ordering principles, proportion, human scale and the basic elements of architecture and interior design. Students develop their own powers of observation throughout the course as they gain new levels of awareness, understanding, and ability related to design.

ABT 114 Introduction to Computer-Aided Drafting (CAD)
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
This course will provide students with the basics in architectural drafting using the applications of computer-aided design. Students will become familiar with keyboard and mouse functions as they apply to architectural drawings. The emphasis will be on wood frame construction. Topics will include use of the CAD system, the role of drawings in the construction process, and the relationship between the drawings.

ABT 115 Introduction to Structures
2 Class Hours, 2 Quarter Credit Hours
This course is a study of basic concepts and terminology used in the design of a building's structural system. The emphasis will be on residential and light commercial construction. Topics covered will include types of loads, load and area calculations, materials, theory of equilibrium, elementary statics, structural components, stair design, foundation design, roof pitches, and the use of span charts found in the Rhode Island State Building Code.

ABT 122 Two- & Three-Dimensional Design Theory
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 112
In this course, students will explore and develop an understanding of abstraction and conceptualization of two- and three-dimensional design relevant to architecture and interiors. Through a series of assigned studio exercises, students will study ordering principles, color theory, and basic elements and organization of space and form.

ABT 124 Construction Methods & Materials
3 Class Hours, 3 Quarter Credit Hours
This course is an introduction to building science relative to the assembly of systems, both structural and non-structural, and to the extensive technical terminology used in the building industry. The main focus of the course will be on commercial construction. Topics will include explanations of major building systems and their assembly, the identification of their components, and the limitations of the systems.

ABT 125 Building Design & Technology I
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
Prerequisites: ABT 112 and ABT 114 and ABT 115
This course will introduce students to the design process and provide additional knowledge about the preparation of residential design development and construction drawings. Based upon a supplied program and site plan, students will design and execute documents for a single-family residence. Standard techniques of wood frame construction will also be discussed. Topics covered will include design theory, site planning, sequencing of drawings, wood frame terminology, components and their proper assembly, and the content of typical drawings necessary for the construction of a wood framed residence. Also included is an explanation of relevant sections of the building code, the importance of their proper use, and their relationship to wood frame construction.

ABT 126 Presentation Techniques
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
This course is an introduction to effective graphic communication and layout techniques, both manual and computerized, which are utilized by design professionals. Students will also be introduced to the software commonly used in the industry. Through lectures, demonstrations, critiques and assignments, students will learn the basic concepts of perspective drawing and software application.

ABT 127 Introduction to Construction Estimating
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 112 and (MA 110 or MA 105)
In this course, students study the estimating procedures and principles used to determine detailed cost estimates in the construction bidding process. The emphasis will be on residential and light commercial construction. Topics covered will include the organization, classification, and quantity surveys of materials and labor costs, subcontracted work, overhead and profit.

ABT 135 Building Design & Technology II
2 Class Hours, 8 Lab Hours, 6 Quarter Credit Hours
Prerequisites: ABT 124 and ABT 125
This course will introduce students to commercial design, the integration of the design to building systems, and the documentation necessary to construct them. Based upon a supplied program and predetermined column configuration, students will design and develop drawings and construction documents for a low rise, steel-framed commercial building. Topics will include design theory, enclosure systems, structural systems and their components, circulation, vertical transportation systems, building code requirements and ADA requirements, and the sequencing of and relationships between the documents.

ABT 137 Introduction to Environmental Systems
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 124 or CR 122 or ID 124
An introduction and qualitative study of typical plumbing, heating, air conditioning, lighting, and electrical systems in buildings. The emphasis will be on light commercial construction.

ABT 138 Surveying & Civil Technology
1 Class Hours, 2 Lab Hours, 2 Quarter Credit Hours
Prerequisites: MA 125
This course introduces and familiarizes students with the science of surveying, applications, equipment, and methods. Topics covered include equipment operation and handling, terminology, leveling, horizontal and vertical measurements, angles, and construction layout. Lab work is supplemented with data plotting and related computations using hand and computer solutions.

ABT 218 Building Information Modeling I (BIM I)
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
Prerequisites: (ABT 114 and ABT 135) or (ABT 114 and ID 132)
This course introduces computer-aided parametric building information modeling as a tool used in the design of buildings and as a means of producing architectural documentation. The primary software product used in this course will be Revit by Autodesk. Topics will include design visualization, bi-directional associativity, interoperability, detailing, intuitive user interface, and parametric components.

ABT 221 Visualization Studies I
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
Prerequisites: ABT 218
This course will cover the primary conceptual and operational aspects of architectural and engineering visualization. Using 3ds Max® Design, the course will explore the program interface and primary command structure. Subjects covered will include geometry, modifiers, materials, linking Revit files, mapping, basic lighting, and rendering.

ABT 223 Structures I
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: MA 125
This course will introduce students to the primary concepts of statics. Topics covered will include concurrent, coplanar and parallel force systems, equilibrium, moment, analysis of statically determinate structures, reactions, and truss analysis using mathematical and graphic methods. Computerized programs for structural analysis will also be introduced.

ABT 225 Building Design & Technology III
4 Class Hours, 6 Lab Hours, 7 Quarter Credit Hours
Prerequisites: ABT 135 and ABT 137 and ID 212 and ABT 218
Students will continue to explore the architectural design process by investigating an existing building, assessing the design and developing an understanding of the subject's spatial, environmental, structural, mechanical and architectural components. Student understanding of this structure will be demonstrated through drawings and models. The analysis will be followed by a building design problem assigned by the instructor. Students will demonstrate their designs and define how the development was informed by the existing building investigations. Topics covered will include drawing, model making, and theory of design, concept formulation and schematic design. Students will make a graphic presentation representing their solution to a jury of critics at the end of the term.

ABT 232 Structures II
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 223
This course will build upon the skills and theories developed in Structures I and introduces students to the primary concepts of strength of materials. Topics covered will include centroids, moment of inertia, shear and moment diagrams, stresses in beams, stress-strain relationships, deflection, combined loading conditions, and column theory.

ABT 235 Building Design & Technology IV
4 Class Hours, 6 Lab Hours, 7 Quarter Credit Hours
Prerequisites: ABT 225
Students will continue to explore the architectural design process by solving a building design problem assigned by the instructor. The project will begin with programmatic information and a raw site and culminate in the design development phase. Topics covered will include theory of design, programming, concept formulation, selection of structural and mechanical systems, and schematic design and design development drawings. The effects of site, environment, precedent and zoning regulation on the design process will be discussed. Students will make a graphic presentation representing their solution to a jury of critics at the end of the term.

ABT 236 Building Codes
2 Class Hours, 2 Quarter Credit Hours
Prerequisites: ABT 135 or (ABT 114 and ID 132)
In this course, students study the codes that regulate the building industry. Topics will include code history, their purpose, and how they are organized. Also included will be a review of the International Building Codes, Mechanical Codes, National Fire Protection Code, and the Americans with Disabilities Act as it pertains to the accessibility of buildings.

ABT 314 Construction Contracts & Specifications
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 232 or ID 315
This course is a study of the procedures used to prepare construction specifications and standard construction contracts. Emphasis will be on commercial construction projects. Topics covered will include the CSI specification format, abbreviated and three-part specifications, party responsibility, liability, and the relationship between contracts and specifications, and contract type versus delivery method.

ABT 315 Structural Wood Design
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
In this course, students study the analysis and design of wood relative to its use as a structural system. Topics will include wood properties, grading rules, allowable working stresses, deflection, connections, flitch beams, framing systems, and loading conditions. Structural differences between solid sawn, laminated, and engineered lumber will be examined as well as the use of computer programs as a design tool.

ABT 324 Masonry Construction & Detailing
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
In this course, students study the technical and mechanical properties of masonry construction relative to its use as a structural and enclosure system. Topics will include shapes and types of masonry block, bond beams, lintels, piers, masonry foundations, typical construction details, brick and stone veneers, integration with other structural systems, and code regulations.

ABT 325 Soil Mechanics & Foundation Design
3 Class Hours, 3 Quarter Credit Hours
In this course, students study the engineering properties of soils and the principles of foundation design. Topics covered will include soil classification, stress, settlement, consolidation, slope stability, bearing pressure, and retaining wall and shallow foundation design.

ABT 328 Structural Steel Design
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
In this course, students study the analysis and design of steel relative to its use as a structural system. Topics will include properties of steel, the design of beams, columns, plates and joists, riveted and welded connections, code compliance, and the use of computer programs as design tools.

ABT 331 Advanced Environmental Systems
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: (ABT 137 or ELY 218) and (ABT 236 or CR 126 or ELY 138)
This course expands upon the theory, applications, and technology studied in ABT 137 Introduction to Environmental Systems. Topics will include heating and cooling, electrical, and plumbing systems used in high rise and commercial building types. Additional topics will include fire suppression systems, related code issues, and sustainable options.

ABT 334 Site Engineering & Planning
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
A study of the concepts and technology used in the design, planning, and engineering of a site relative to land use and real estate development. The emphasis will be on residential single and multi-family development. Topics will include site analysis and selection, plane surveying, grading, roads, drainage, utilities, density, erosion and sediment control, zoning and environmental regulations, and federal, state and municipal approvals. Students will develop a graphic solution for an assigned real estate development project.

ABT 337 Building Information Modeling II (BIM II)
2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours
This course expands upon the theory and applications of computer-aided drafting and building information modeling studied in ABT 218 Building Information Modeling I. The emphasis will be on advanced use of Revit by Autodesk and increased productivity techniques.

ABT 338 Reinforced Concrete Design
4 Class Hours, 4 Quarter Credit Hours
In this course, students study the analysis and design of reinforced concrete elements relative to their use as a structural system. Topics will include properties of reinforced concrete, the design of beams, columns, and one-way slabs, positive and negative moment and shear reinforcement, pre-stressed concrete, code compliance, and the use of computer programs as design tools.

ABT 340 Laser Scanning & Point Clouds
2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours
Prerequisites: ABT 218 and (ABT 337 or CMT 329)
This course is an introduction to the theory and application of photogrammetry and laser scanning technology. Specific topics will include the operation and use of technology to scan and create point clouds relative to developing floor plans, 3D models of interior and exterior conditions, and topography. Case studies and applications to other applications will also be discussed.

ABT 410 Building Design & Technology V (Low Rise)
4 Class Hours, 6 Lab Hours, 7 Quarter Credit Hours
Prerequisites: ABT 236 and ABT 314 and ABT 315 and ABT 324 and ABT 325 and ABT 328 and ABT 331 and ABT 334
In this course, students will explore the relationship between architectural design and the engineering and technology necessary to bring those designs to fruition. The emphasis will be on low rise buildings. Each student will develop a design solution for an assigned problem including the analysis and integration of the building, structural, and environmental systems. Students will make a graphic presentation representing their solution to a jury of critics at the end of the term.

ABT 412 Sustainability in Construction
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 331
In this course, students will study the concepts and applications of sustainability in construction. Topics will include sustainable requirements, sustainable practices in the design and construction of buildings, life cycle analysis, environmental regulations, sustainable global initiatives, and criteria for LEED.

ABT 416 Portfolio Development
3 Class Hours, 3 Quarter Credit Hours
Corequisites: ABT 410
In this course, students will develop a professional portfolio showcasing their personal work developed while attending NEIT. The quality shall be suitable to the interview process. Along with weekly development critiques from the instructor, students will make a final presentation to a review committee at the end of the term.

ABT 420 Building Design & Technology VI (High Rise)
4 Class Hours, 6 Lab Hours, 7 Quarter Credit Hours
Prerequisites: ABT 410
In this course, students will further explore the relationship between architectural design, engineering, and technology relative to high rise buildings. Each student will develop a design solution for an assigned problem including the analysis and integration of the building, structural, and environmental systems. Students will make a graphic presentation representing their solution to a jury of critics at the end of the term.

ABT 421 Acoustics & Lighting
3 Class Hours, 3 Quarter Credit Hours
In this course, students study the basic concepts, terminology, and technical understanding of acoustics and illumination relative to building and site design, construction, and human comfort. Topics will include noise transmission and control, acoustical properties of materials, STC ratings of assemblies, natural and artificial illumination, lighting calculations, selections of fixtures and systems, and code regulation.

ABT 427 Senior Thesis Proposal & Research
2 Class Hours, 2 Quarter Credit Hours
This course is a direct preparatory course for ABT 430/ID 430 Senior Thesis. The intent of the course is to guide and assist students through the process of initial project selection, site selection, proposal preparation, and the collection, synthesis and publication of a comprehensive research document for the thesis project. Topics will include project selection, site analysis, research, and architectural programming.

ABT 430 Senior Thesis
2 Class Hours, 6 Lab Hours, 5 Quarter Credit Hours
Prerequisites: ABT 410 and ABT 420 and ABT 421 and ABT 427
This is a direct-studies course in which students must demonstrate to the architectural and construction faculty their understanding of and ability to utilize and synthesize the design, technical and engineering concepts they have developed throughout their university experience. Prior to the commencement of the term, students will submit, in proposal format, a project for review and approval by the faculty. Students will work independently with weekly interaction with a faculty advisor. The term will culminate with a formal presentation to a jury of faculty and critics.

ABT 433 Construction Law
3 Class Hours, 3 Quarter Credit Hours
Prerequisites: ABT 314
This course examines the aspects of law which are unique or of special interest to the construction and architectural process. Topics will include government regulations, bidding, contracts, formation and interpretation of contract documents, liability, risk management, and dispute resolution.